

Effects of Curing Methods on the compressive strength of Concrete

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Abstract: This paper displays the effects of an experimental investigation of the impacts of curing techniques on the compressive strength of concrete. The development in the construction industry have cleared route for the improvement of the new curing procedures and development synthetic substances. curing is essential if concrete is to play out the planned capacity over the structure life of the structure while excessive curing time may prompt the heightening of the development cost of the project and unnecessary delay in construction. In this project the compressive strength of concrete has been tested on concrete blocks by different different curing methods i.e curing compound method & ponding method.

Keywords: Curing Compound Method, Compressive Strength, Concrete.

I. INTRODUCTION

Curing can be defined as the way toward keeping up a good dampness content and an ideal temperature in concrete during the period quickly following arrangement, with the goal that hydration of concrete may proceed until the ideal properties are created to an adequate temperature to meet the desired property. Curing of concrete assumes a significant job in building up the microstructure and pore structure of concrete. Uniform temperature ought to be kept up all through the concrete to dodge warm shrinkage splits. On the off chance that curing is dismissed in the early time of hydration, the nature of concrete will experience a kind of irreparable loss. The efficiency of curing compound will mainly depend upon the time of application of compound on the concrete.

Time period and temperature are the two parameters which govern the curing of concrete.

II. METHODS OF CURING

2.1 Ponding and Immersion: On level surfaces, for example, asphalts and floors, cement can be cured by ponding. Ponding is a perfect method for keeping loss of dampness from the solid; it is likewise compelling for keeping up a uniform temperature in the concrete. The curing water ought not be more than about 11°C (20°F) cooler than the concrete to forestall warm anxieties that could bring about breaking. Since ponding requires extensive work and supervision, the technique is commonly utilized distinctly for little employments. The most intensive method for with water comprises of all out drenching of the completed solid component.

2.2 Curing compound method: - A curing compound is a fluid substance that is included as a surface covering freshly introduced concrete. curing compound are utilized to decrease the loss of water or warmth so as to make perfect conditions that are positive for the solid development Various kinds of curing compound are accessible in the market, fundamentally incorporates water-based, resin solvent based,

chlorinated elastic, wax based and so on. Water based restoring compound is most utilized relieving compound worldwide These mixes are applied on the uncovered surface of the solid by the assistance of roller, brush or splash .

III. CURING PERIOD

The span of curing of cement relies upon the evaluation and kind of concrete, blend extent, desired concrete quality, shape and size of the concrete individuals and natural and presentation condition. The span may changes from a couple of days to a month. The time period that concrete ought to be shielded from freezing, high temperatures, and against loss of dampness relies on various variables such as the sort of establishing materials utilized, blend extents, required quality, size and state of the concrete, encompassing climate; and future introduction conditions. The curing time frame might be 3 weeks or longer for lean concrete blends utilized in enormous structures, for example, dams, reservoir, public structures etc.

IV. EXPERIMENTAL STUDIES

4.1 MATERIALS PROPERTIES:

4.1.1 CEMENT: Ordinary Portland Cement of 33 grade affirming to IS 12269-1987 was utilized.

4.1.2 SAND: The sand used in the examination was passed from the sieve 4.75 mm and retained on 75 micron sieve.

4.1.3 AGGREGATE: The aggregate according to IS 383-1970 was utilized. The aggregate was passed from sieve 20 mm and retained on sieve size 10 mm.

4.1.4 WATER: Consumable water was utilized in the test work for both curing and mixing purpose.

4.1.5 CURING COMPOUND: The water based curing compound was used in the examination.

4.2 MIX PROPORTION:

The mix proportion for M20 grade concrete is utilized in the present work. It is planned as per IS 10262-1982.

4.3 EXPERIMENTAL INVESTIGATION:

The experiment was directed to find the increased compressive strength for different methods of curing. The test were directed at 7, 14 and 28 days of period. For that we followed system as per IS code determinations. 12 cubes were casted out of these 4 cubes of conventional concrete, 4 cubes of single layer curing compound and 4 cubes of double layer curing compound.

V. RESULT

Table 1: Strength differences as per different curing methods

Curing Methods	Compressive strength for the different periods in N/mm ²		
	7 days	14 days	28 days
Ponding method	14.44	16.24	19.62
Curing compound method (Single layer)	14.22	16.02	19.33
Curing Compound method (Double layer)	14.26	16.12	19.40

VI. CONCLUSION

1. Conventional water curing is the most effective method of curing as compared to membrane curing.
2. Water based curing compound can achieve 98% to 99% of compressive strength as compared to conventional water curing.
3. Curing compound method is the most practical and widely used method as it is mostly suitable in water scarce area, according to the study in the research it indicates that curing compounds could be utilized in situations where curing with water is difficult.
4. Compound curing is found to be slightly costly as compared to conventional curing.
5. A double layer application of compound does not significantly improve the compressive strength of concrete as compared to single layer.

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